

## **Stage 2 Constructability Review Recommendations**

**Stage 2 is the phase between the Preliminary and Final Field Checks. Plans are 55% complete.**

**It is at this stage that the constructability review will be most effective and have the most significant impact.**

**In Stage 2, bridge plans, costs and structural requirements, any foundation considerations or materials involved a review of all traffic requirements for the project. Preliminary quantities and right-of-way requirements are made. Signalization, phasing utilities plans and railroad needs are identified and developed. Signal plans, signing plans and pavement marking plans reviewed by Traffic Engineer? Right of Way, drainage, structure and geotech plans are finalized. Details of hydraulic requirements along with any special drainage structures. This review should ensure that the design team including all of the involved functions (or offices) have the necessary direction to proceed to the final design stage and that any major changes, revisions or special considerations are identified with resolution to be made and scheduled. Review plans with respect to geotechnical recommendations.**

### **Stage 2 Documents**

- **Preliminary Field Check Meeting Report**
- **Value Engineering Report**
- **Geotech and Soils Report**
- **Stage 2 Plans**
- **Cost Estimate (See Addendum)**
- **Draft Traffic Control Recommendation**
- **Hydraulics Report/Plan including drainage layout**
- **Bridge General Plans with schedules, concepts, costs and preliminary quantities for all bridges**
- **Completed earthwork and grading plan**
- **Environmental Document complete**
- **Approval R/W Plan with any recommended mitigation or design and construction commitments**
- **A list of recommendations and commitments for permit requirements including schedules/commitments by the permitting agencies**
- **Bridge Foundation Review Form**
- **Verify if MOT can be supported on existing pavement or shoulders**
- **Commitment Report**



**Indiana Department of Transportation  
Project Constructability Review 2  
Stage 2 Plan Review Submission**

Primary DES No. \_\_\_\_\_ Contract No. \_\_\_\_\_

Route \_\_\_\_\_ District \_\_\_\_\_

Work Type \_\_\_\_\_ RFC Date \_\_\_\_\_

Project Location \_\_\_\_\_

Project Description \_\_\_\_\_

County/City/Town \_\_\_\_\_ Designer \_\_\_\_\_

Project Manager \_\_\_\_\_

Reviewed by \_\_\_\_\_ Title \_\_\_\_\_

Date \_\_\_\_\_

	Y	N	NA	Note	Flag
<b>A. Plans - Road</b>					
1. Do roadway plans detail positive drainage for each phase of construction?					
* 2. Do roadway plans clearly identify adequacy of pipe and structure location?					
* 3. Are phases of work considered in calculating earthwork balances and appropriate pay items?					
* 4. Is the bridge cone fill quantity shown in the road earthwork balance?					
* 5. Is all earthwork activity reflected? Rock? Peat?					
* 6. Is an earthwork summary in the plans?					
* 7. Are cut/fills accurately shown where match lines are necessary?					
* 8. Are clearing and grubbing limits identified?					
* 9. How is shrink/swell factor applied to earthwork tabulation?					
* 10. Are shrink/swell factors reasonable?					
11. Is the quantity of borrow shown on the plans?					
* 12. Is earthwork phasing compatible with construction requirements?					
* 13. Are paving limits shown?					
* 14. Is milling required?					
* 15. Can existing roadway materials be salvaged for other use?					
* 16. Is blasting allowed?					
* 17. Will excavated rock fit into available fills?					
* 18. Is there rock in drainage trench? Will blasting be required or allowed?					

**Project Constructability Review (Stage 2)**

\* - Item related to consultant designer evaluation

**Y** - Yes, **N** - No, **NA** - Not Applicable, **Note** - See note number, **Flag** - Item requires priority attention

	Y	N	NA	Note	Flag
* 19. How long of period can highway be closed for blasting/clearing?					
20. Any presence of ground water or active streams?					
* 21. Is sheeting or shoring necessary to protect roadway? If so, an item will be required.					
* 22. Are buildings to be demolished? Will an asbestos and lead evaluation be made?					
* 23. Is illumination (existing) to be maintained during construction?					
* 24. Do driveway/turnout grades meet allowable standards?					
* 25. Consider proposed terrain when locating sign foundations.					
* 26. Are ADA requirements clear and constructible?					
<b>B. Plans - Bridge</b>					
* 1. Have foundation locations been checked for ROW infringements?					
* 2. Access to structure site?					
* 3. Is there adequate room for pile driving operations?					
* 4. Consider working areas needs around structures.					
* 5. Are soil conditions compatible for steel shell piling?					
* 6. Will caisson drilling require special measures?					
* 7. Is dewatering required?					
* 8. Has substructure been examined for scour?					
* 9. Is cofferdam required?					
* 10. Ensure that when cofferdam and pumping is an item in the contract, wet excavation is also an item. Is underwater (tremie) concrete required?					
11. Are there conflicts between existing foundations and proposed foundations?					
* 12. Are the proper types of retaining walls specified to meet the site characteristics? (i.e. Are cut walls used in fill or fill walls used in cuts?)					
* 13. Have the proposed drainage features (pipes, structures, outlets) been coordinated with the bridge plans; specifically the foundations.					
* 14. Are there conflicts with the bridge foundations and the utilities (existing and relocated)					
* 15. Is shoring required to build the structure?					
* 16. Is there enough room, both horizontal and vertical, to construct typical shoring methods between construction phases?					
* 17. Check for overhead utility conflicts.					
* 18. Is there adequate room to install anchor bolts for bearing assemblies?					
* 19. Are the wingwalls too long to be supported without a pile?					
* 20. Is there enough room for all permanent retaining wall elements to fit within the proposed R/W?					
* 21. Are closure pours required for bridges with phased construction?					
* 22. Do post-tensioned elements provide enough room for the PT Jacking equipment?					
* 23. Can Bridge large or heavy members be transported legally without limitations on existing roads, bridges, or hauling equipment?					

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* 24. Check out haul routes through metropolitan areas – restrictions?					
25. Is there adequate structure vertical clearance over entire project travelway?					
<b>C. Cost Estimate (Pay Items, Quantities)</b>					
* 1. Does the estimate include a pay item for all work included in the plans? Do pay items reflect scope of work?					
* 2. Are pay items accurate?					
* 3. Are cost estimates and unit prices appropriate for type of project?					
* 4. Are quantity estimates developed to appropriate level for this review?					
* 5. Are quantities reliable, verifiable?					
* 6. Were quantity calculations of Road and Bridge Plans checked for overlap as well as missing items?					
* 7. Were all temporary items for maintenance of traffic included?					
* 8. Are appropriate partners involved in the estimate review?					
<b>D. Site Investigation</b>					
* 1. Is the additional site survey completed as necessary?					
* 2. Is the geotechnical engineering completed as necessary?					
* 3. Is the site drainage plan, including construction phases, being developed?					
* 4. Review potential drainage problems through temporary construction.					
* 5. Has offsite drainage been considered (beyond construction limits)?					
* 6. Is drainage properly controlled at the ends of structures?					
* 7. Can existing drainage patterns be maintained during construction?					
* 8. Do the pipe sizes and angles fit the existing drainage structures?					
* 9. Is there sufficient R/W to trench drainage structures?					
* 10. Are special structures required because of pipe size or number of pipes?					
* 11. Are existing structures to remain or be reset in good shape? i.e.: frames, grates, walls.					
* 12. Check for conflicts with existing/proposed drainage.					
* 13. What are the locations of Geotech investigations? When were they taken?					
* 14. Has Geotech taken cores of the existing pavement and shoulder to verify the structure of the existing roadway? Where were cores taken?					
* 15. Does structure depth prohibit trenching?					

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<b>E. Right of Way</b>					
1. Has the required R/W been identified and sufficient for the project and all necessary construction operations?					
* 2. Is the clearing and staking contract being developed as applicable?					
* 3. Sufficient R/W available for all operations?					
* 4. Sufficient R/W for equipment and material storage?					
* 5. Staging needs met?					
* 6. Access requirements?					
* 7. Access to work areas?					
* 8. Is temporary R/W for construction access identified?					
* 9. Is there enough Right-of-Way to construct the slopes as shown?					
* 10. Is there enough work room for the contractor to construct the slopes?					
* 11. Is the Right-of-Way conducive to utility relocates?					
* 12. Is there sufficient R/W to relocate all utilities?					
* 13. Does R/W account for buried drainage features?					
* 14. Is it straight to allow for power pole runs without a bunch of down guys?					
* 15. Do the structures fit in the R/W?					
* 16. Is there enough work room to build the structures on the R/W?					
* 17. Any R/W active commitment? Or is the commitment already in the plans?					
* 18. Are all encroachments and instruction on handling them clearly communicated?					
* 19. Is there a cemetery within the project limits? If so, has a cemetery plan been developed and clearly communicated?					
<b>F. Utilities and Railroad</b>					
* 1. Are utility conflicts identified?					
* 2. Are all known utilities indicated on plans?					
* 3. Any Utility active commitment? Or is it in the plans?					
* 4. Are the utilities and drainage shown on the Cross sections?					
* 5. Can reasonable changes be made to avoid utility conflicts?					
* 6. Are utilities to be maintained during construction? If so, are provisions in place?					
* 7. Are any substations or utility appurtenances within the construction area required to be accessed during construction? If so, have provisions been included in specs?					
* 8. Are relocations extensive enough to request an early order to start for utilities?					

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* 9. Will overhead utilities be in conflict with proposed construction and/or the use of construction equipment such as cranes or pile drivers? If so, should they be relocated?					
* 10. Are privately owned services involved? Is there a bid item for these relocations?					
* 11. Will utility work impact contaminated soil? Are provisions to perform this work in the agreement?					
* 12. Are pole relocations in conflict with proposed sidewalks?					
* 13. Are utility durations taken into account with the overall construction schedule? Is it realistic?					
* 14. Identify utility drainage conflicts on plans.					
* 15. Is underground work sequenced with roadway operation?					
* 16. Are soil conditions conducive for trenching?					
* 17. Do catch basin conflict with underground utilities?					
* 18. Is railroad coordination in progress as required?					
* 19. Rail shop drawing submittals, if known require a long lead time, a note should be placed in contract indicating such.					
* 20. Railroad protection or flagger item included in contract if needed. Has a force account with the Railroad been processed?					
* 21. Are there any RR crossings located in the proposed detour route?					
* 22. If required, has railroad insurance been acquired and coordinated?					
<b>5. Environmental</b>					
* 1. Are required environmental permits identified & applications drafted?					
* 2. Any Environmental active commitment instead of permits?					
* 3. Have the mitigation requirements been identified & plans developed?					
* 4. Are the E&SC plans & provisions developed & coordinated with agencies?					
* 5. Are the environmental restriction period impacts identified?					
* 6. If contamination exists on the site, have the proper type and quantity of borings and pump tests been performed?					
* 7. If contaminated soil, are there provisions for handling/treating?					
* 8. If the work is located adjacent to a residential area or occupied building, provisions may be required to minimize the impact of noise producing activities, such as restricted work hours or temporary noise barriers.					
* 9. Can the roadway and/or structures handle the load of this piece of equipment, the paving train?					
* 10. If present, are historical structures identified on plans with clear instruction on limitations and handling?					

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<b>H. Traffic Maintenance &amp; Traffic Management Plans</b>					
* 1. Is detour necessary for averting delays/congestion?					
* 2. Adequate turn lanes provided to avoid traffic backups?					
* 3. Have appropriate MOT plan and phases been developed?					
* 4. Is the TMP being developed and coordinated with appropriate entities?					
* 5. Does the TMP adequately address site conditions and traffic volumes?					
* 6. Does the MOT plan address adequate work area for construction operations?					
* 7. Are conflicts with other work in area of project being addressed?					
* 8. Will ramps have to be closed?					
* 9. Have detours been checked for illumination?					
* 10. Does detour allow enough area for planned work?					
* 11. Check access for local business/residents.					
* 12. Does signing meet traffic needs in each phase?					
* 13. Are work zones large enough for equipment access?					
* 14. Can emergency vehicles travel through zones without delays?					
* 15. Is there adequate vertical clearance in all phases of the MOT?					
* 16. Is power for temporary/permanent utilities available?					
* 17. Check driveways/sidewalks for conflicts with utilities.					
* 18. Is existing drainage affected by the temporary pavement?					
* 19. Was construction loading on bridge decks considered during each phase?					
* 20. Is work zone safety waiver required? If so, has it been acquired?					
* 21. Is route a special truck route (permitted wide load, extra heavy duty truck route)? If so, does the MOT accommodate these vehicles?					
* 22. Are temporary markings and safety devices proper and sufficient?					
<b>I. Construction Phasing</b>					
* 1. Are proposed construction phases appropriate and constructible?					
* 2. Are constructability issues between phases identified and addressed?					
* 3. Have Unique Special Revisions required by the construction phasing been drafted?					
* 4. Phased to provide minimum number of stages and reasonable work areas and access?					
* 5. Are there areas with restricted access?					
* 6. Are work zone widths adequate for construction equipment needs?					
* 7. Are travel lanes adequate? Width? Number? Wide Loads?					

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* 8. Project phasing considered drainage construction?					
9. Does staging cause special conditions (i.e. structural adequacy/stability)? If shoulders are required to carry traffic during stage construction, are they structurally adequate or should reconstruction be required?					
* 10. Proposed adjacent contracts, restrictions, constraints identified and accounted for?					
* 11. Can these details, as shown on the plans, be constructed using standard industry practice, operations, and equipment?					
* 12. Will traffic signal preformed loops work with phasing?					
* 13. Are these grade changes between phases that won't allow access to adjacent properties?					
* 14. Are temporary roadways and pavements required to complete construction? If so, details are required.					
* 15. Should limits of work be staged to minimize disruption to the public?					
* 16. Will existing barriers have to be relocated?					
* 17. If staged construction, has balance of cuts and fills been done for each stage? Are temporary stockpile locations identified on the plans, if needed?					
* 18. Does proposed drainage function during construction phases?					
* 19. Is bridge construction phasing consistent with road construction phasing? (horizontal & vertical)					
* 20. Do the utility relocation plans work for all phases of construction?					
<b>J. Schedule &amp; Special Considerations</b>					
1. Is letting schedule appropriate for desired completion date?					
2. Does schedule address other work in area or related contracts in project?					
3. Does schedule address environmental restriction periods?					
4. Does schedule address local events, holidays, etc.?					
5. Does schedule address special material procurement time?					
6. Does schedule address removal of hazardous materials as necessary?					
7. Does schedule address utility relocation timeline?					
8. Does schedule address railroad coordination as necessary?					
<b>K. General Considerations?</b>					
* 1. Is adequate notice & review time provided prior to Public Meeting?					
* 2. Are documents developed to appropriate level for this review?					
* 3. Are comments from previous review adequately addressed?					
* 4. Are quantity estimates developed to appropriate level for this review?					

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